Synthesis, characterisation, dielectric, and optical properties of the chitosan/poly(ethylene glycol)/ magnesia biopolymer nanocomposites

S. El-Sayed & Adel M. El Sayed, Synthesis, characterisation, dielectric, and optical properties of the chitosan/poly(ethylene glycol)/ magnesia biopolymer nanocomposites" Journal of Materials Technology **34** (2019) 602-614.

Abstract

Biopolymer blends and nanocomposites based on chitosan (Cs) are promising in various technological applications. Magnesia (MgO)/Cs/poly(ethylene glycol)(PEG) nanocomposites were prepared by casting technique. Scanning electron microscopy (SEM) showed a homogeneous dispersion for MgO on the surface of the porous CsPEG films. XRD and FTIR spectra revealed a significant change in the crystallinity and intensity of the characteristic peaks of the functional groups in the composite films with increasing the content of MgO. The dielectric properties of the films were studied in the range 306– 411 K and 0.1 kHz – 5 MHz. Two relaxation peaks were observed for pure, and 5 wt% magnesia-doped CsPEG. The correlated barrier hopping (CBH) is the most suitable conduction mechanism. Transmittance, refractive index (n) and various optical parameters were calculated and given. The outcome results confirm the possibility of broadening the multifunctionality of Cs to include tissue engineering, removing unwanted products and antireflection coating applications.